## 1. Measurement condition :

| | | |
|---|---|---|
| Ambient temperature $T_A$: | 25 °C | |
| Input power level: | 0 dBm | |
| Terminating impedances in $f_C$ * ): | for input: | 310 Ω ‖ - 25,7 pF. |
| | for output: | 690 Ω ‖ - 10,1 pF. |
| Source impedance . | 50 Ω. | |
| Load impedance . | 50 Ω. | |

## 2. Characteristics :

Remark: Reference level for the relative attenuation $a_{rel}$ of the **TFS 35B** is the minimum of the pass band attenuation $a_{min}$. The minimum of the pass band attenuation $a_{min}$ is defined as the insertion loss $a_e$. The reference frequency $f_C$ is the arithmetic mean value of the upper and lower frequencies at the **3 dB** filter attenuation level relative to the insertion loss $a_e$. . The nominal frequency $f_N$ is fixed at **35,42 MHz** without tolerance. All specified values are guarantied in operating temperature range.

| **D a t a** | | **typ. value** | | **tolerance / limit** | | |
|---|---|---|---|---|---|---|
| **Insertion loss** (Reference level) | $a_e$ | 14,8 | dB | max. | 17 | dB |
| **Nominal frequency** | $f_N$ | - | | 35,42 | | MHz |
| **Centre frequency** $f_C$ at ambient temperature ($f_{CTA}$) | | 35,42 | MHz | - | | |
| **Pass band :** | **PB** | | | $f_C$ ... $f_C$ ± 0,80 | | MHz |
| **Amplitude ripple in PB (p-p) :** | | 0,6 | dB | max. | 1,6 | dB |
| **Bandwidth :** | **BW** | | | | | |
| 1 dB | | 2,01 | MHz | min. | 1,7 | MHz |
| 3 dB | | 2,44 | MHz | | - | |
| 21 dB | | 3,32 | MHz | max. | 3,74 | MHz |
| **Relative attenuation in O.T.R. :** | $a_{rel}$ | | | | | |
| 34,62 MHz ... 36,22 MHz | | 0,8 | dB | max. | 1,6 | dB |
| 0,1 MHz ... 7 MHz | | 55...27 | dB | | - | |
| 7 MHz ... 28 MHz | | 55...50 | dB | min. | 35 | dB |
| 28 MHz ... 31 MHz | | 35 | dB | min. | 30 | dB |
| 31 MHz ... 33,5 MHz | | 40...30 | dB | min. | 21 | dB |
| 37,34 MHz ... 39,84 MHz | | 27...42 | dB | min. | 21 | dB |
| 39,84 MHz ... 62,42 MHz | | 45...60 | dB | min. | 35 | dB |
| 62,42 MHz ... 72,42 MHz | | 36 | dB | min. | 30 | dB |
| 72,42 MHz ... 110,42 MHz | | 70...80 | dB | min. | 40 | dB |
| **Group delay ( mean value in PB ):** | | 1,4 | µs | max. | 1,7 | µs |
| **Group delay ripple in PB (p-p) :** | | 200 | ns | max. | 300 | ns |
| **Deviation from linear phase in PB (p-p) :** | | ± 2 | degree | | - | |
| **Triple transit attenuation compared to main signal** | | 35 | dB | | | |
| **Crosstalk attenuation compared to main signal** | | 50 | dB | | | |
| **Temperature coefficient of frequency ( $Tc_f$ )** | | - 20 | ppm/K | | - | |
| **Frequency deviation of $f_C$ over temperature** | | $\Delta f_C(Hz) = Tc_f(ppm/K) \times (T - T_A) \times f_{CTA}$ (MHz) | | | - | |
| **Operating temperature range ( O.T.R. )** | | - | | - 40 °C ... + 85 °C | | |
| **Storage temperature range** | | - | | - 40 °C ... + 85 °C | | |

*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

**Generated:** **Chillla**

**Checked / approved:** **Dr. Wall**

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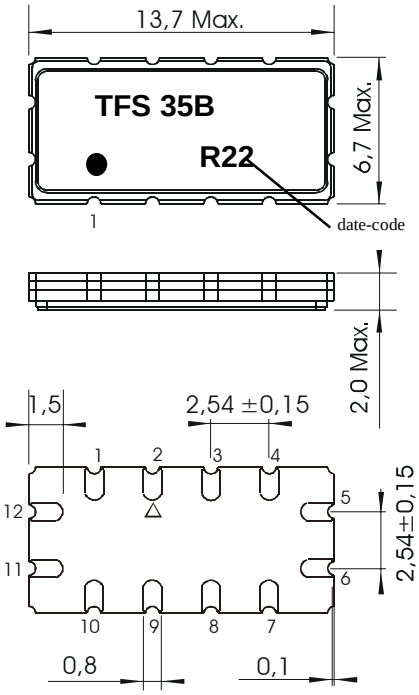
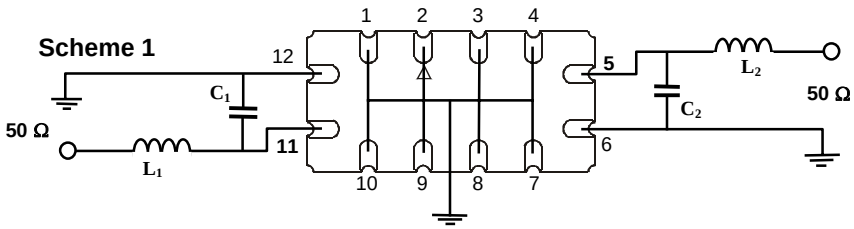
**3. Package and pin connection :** (All dimensions in mm)



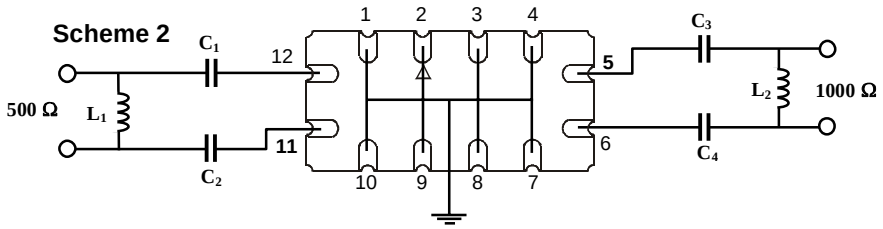

| date -code: | year + week |
|---|---|
| N | 2001 |
| P | 2002 |
| R | 2003 |
| ... | ... |

| | |
|---|---|
| Pin **11** | **Input** |
| Pin 12 | Input RF Return |
| Pin **5** | **Output** |
| Pin 6 | Output RF Return |
| Pin 1-4, 7-10 | Pakage Ground |

**4. 50 Ω matching network ( for details refer to application note ):**




**4.1 Matching network for 500 Ω x 1000 Ω ( for details refer to application note ) :**




**For final test we use scheme 1.**

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## 5. Stability characteristics :

After the following tests the filter shall meet the whole specification:

| | |
|---|---|
| 1. Shock: | 500g, 18 ms, half sine wave, 3 shocks each plane;<br>DIN IEC 68 T2 - 27 |
| 2. Vibration: | 10 Hz to 500 Hz, 0,35 mm or 5g respectively, 1 octave per min, 10 cycles per plan, 3 plans;<br>DIN IEC 68 T2 - 6 |
| 3. Change of temperature | -55 °C to 125°C / 30 min. each / 10 cycles<br>DIN IEC 68 part 2 – 14 Test N |
| 4. Resistance to solder heat (reflow): | reflow possible: twice max.;<br>for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4; |

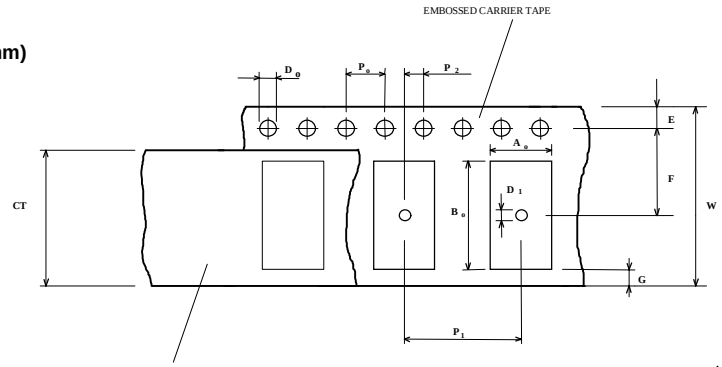
## 6. Packing :

Tape & Reel: DIN IEC 286 - 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

| | |
|---|---|
| max. pieces of filters per reel: | 1700 |
| reel of empty components at start: | min 300 mm |
| reel of empty components at start including leader: | min 500 mm |
| Trailer | min 300 mm |

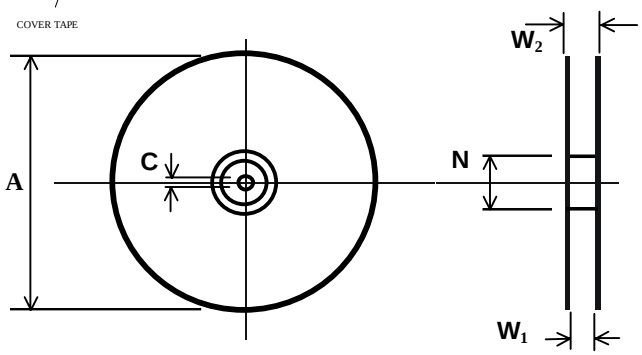
**Tape (all dimensions in mm)**

| | | | |
|---|---|---|---|
| W | : | 24 | ± 0,3 |
| Po | : | 4 | ± 0,1 |
| Do | : | 1,5 | + 0,1 |
| E | : | 1,75 | ± 0,1 |
| F | : | 11,5 | ± 0,1 |
| G (min) | : | 0,6 | |
| P2 | : | 2 | ± 0,1 |
| P1 | : | 12 | ± 0,1 |
| D1(min) | : | 1,5 | |
| Ao | : | 7,1 | ± 0,2 |
| Bo | : | 13,9 | ± 0,2 |
| CT | : | 21,5 | ± 0,1 |




**Reel (all dimensions in mm):**

| | | |
|---|---|---|
| A | : | 330 |
| W1 | : | 24,4 + 2 |
| W2(max) | : | 30,4 |
| N(min) | : | 60 |
| C | : | 13 +0,5/-0,2 |




The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. Markings on the filters can be read if the upper side of the carrier tape is regarded with the sprocket holes on its right.

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## 7. Air reflow temperature conditions :

1st and 2nd air reflow profile

| **Name:** | pre-heating periods | main-heating periods | peak temperature |
|---|---|---|---|
| **Temperature:** | 150 °C - 170 °C | over 200 °C | 255 °C ± 5 °C |
| **Time:** | 60 sec. - 90 sec. | 20 sec. - 25 sec. | |

**Air reflow profile**

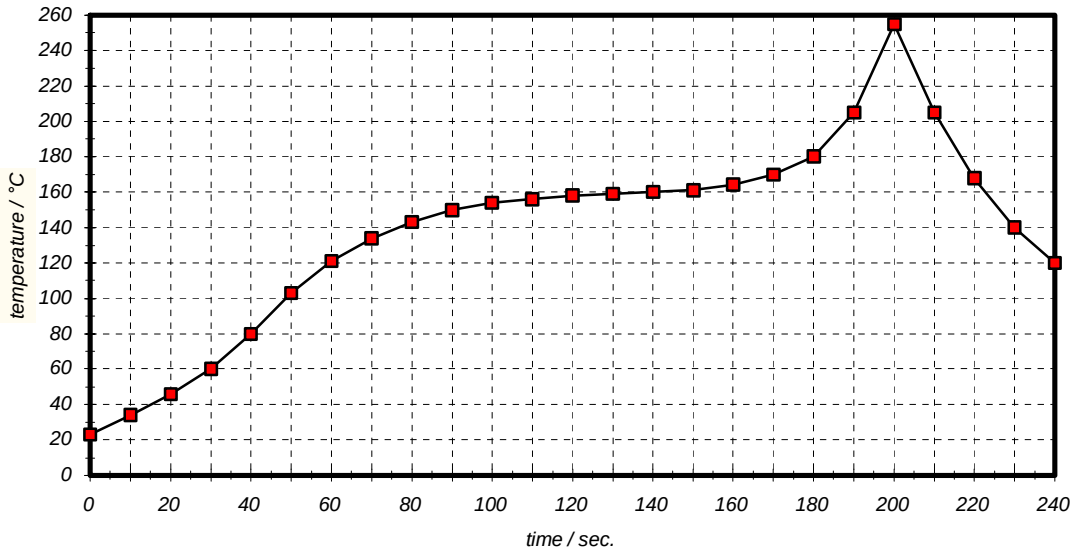


Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

| time / sec. | temperature / °C | time / sec. | temperature / °C |
|---|---|---|---|
| 0 | 23 | 140 | 160 |
| 10 | 34 | 150 | 161 |
| 20 | 46 | 160 | 164 |
| 30 | 60 | 170 | 170 |
| 40 | 80 | 180 | 180 |
| 50 | 103 | 190 | 205 |
| 60 | 121 | 195 | 230 |
| 70 | 134 | 200 | 255 |
| 80 | 143 | 205 | 230 |
| 90 | 150 | 210 | 205 |
| 100 | 154 | 215 | 180 |
| 110 | 156 | 220 | 165 |
| 120 | 158 | 230 | 140 |
| 130 | 159 | 240 | 120 |

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## 8. History

| Version | Reason of Changes | Name | Date |
|---|---|---|---|
| **1.0** | - generate specification. | Chilla | 10.02.03 |

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